

**DATA ON THE BAT FAUNA
OF THE UPPER PART OF THE TÂRNAVA RIVERS BASIN
(TRANSYLVANIA, ROMANIA)**

*Csaba JERE * and Annamária DOCZY ***

* Romanian Bat Protection Association, 7/10 Independenței Street, Odorheiu Secuiesc, Harghita County, Romania, RO - 535600, jerecsaba@yahoo.com

** Romanian Bat Protection Association, 62 Szek Street, Miercurea Ciuc, Harghita County, Romania, RO - 530201, zsoagod@freemail.hy

KEYWORDS: chiroptera, distribution, species.

ABSTRACT

The paper presents the results of chiropterological researches carried out since 1999 in the upper part of the Târnava Rivers Basin. During the study nine bat species were identified. Check-up of village churches, detecting and determination of dead specimens were used as methods. Bats were present in more than half of the checked churches. This fact suggests the importance of old buildings as roosts for bats, and their considerable role in bat protection.

ZUSAMMENFASSUNG: Daten zur Fledermausfauna des oberen Teils des Târnava-Flusstals (Transsilvanien, Rumänien).

Der Aufsatz stellt die im Jahre 1999 gesammelten Daten über die Fledermausfauna von dem oberen Teil des Flussbeckens der Târnava vor. Während der Datenerhebung haben wir neun Fledermausarten festgestellt. Dabei gingen wir nach folgender Methode vor: Untersuchung von Gebäuden (hauptsächlich der Kirchen), Beobachtungen mit Detektor, Untersuchung der gestorbenen Exemplare. In mehr als der Hälfte der Kirchen haben wir Fledermäuse gefunden. Diese Daten beweisen die Wichtigkeit und die Bedeutung der Kirchen beim Schutz der Fledermäuse.

REZUMAT: Date referitoare la fauna de lilieci din bazinele superioare ale râurilor Târnave.

Lucrarea prezintă datele colectate începând din anul 1999, despre fauna de lilieci din zona superioară a Bazinului Târnavelor. În cursul studiului nouă specii de lilieci au fost identificate, prin aplicarea următoarelor metode: controlarea bisericilor, utilizarea detectoarelor de ultrasunete, determinarea exemplarelor moarte. Liliicii erau prezenți în mai mult de jumătate a bisericilor controlate, fapt ce arată importanța acestora ca adăpost pentru lilieci, lucru care nu trebuie neglijat în protecția acestor animale.

INTRODUCTION

The nature degradation due to human activity was increased in the last decades. Bats are endangered in every respect, many species have their roosts in buildings, or in other places expose to human disturbance (e.g. forests, caves). For this reason the direction of natural processes in bat populations become more and more determinated by the human interference.

In Romania the knowledge about bats distribution and ecology is extremely poor. Papers published in the past decades are focused mainly in cave-dwelling bats, very few publications are about hose-dwelling bats (Barbu and Sorescu, 1968; Valenciuc and Ion, 1969; Valenciuc, 1989; Răduleț, 1997). Studies started in the last few years are focused on bats distribution and some ecological aspects, which can provide important data for protection measures.

For the territory of Harghita County we can find some chiropterological data in the literature (Méhely, 1900; Paszlawzsky, 1918; Dumitrescu et al., 1962 - 1963), but none from the study area. In 1999 - 2000 was made a study on house - dwelling bats in this county (Jére and Dóczy, 2001), and some of the data collected during the study are from the Târnava Rivers Basin.

MATERIALS AND METHODS

The study area situated in the western hilly part of Harghita County, in the vicinity of the western slopes of the Eastern Carpathians. The boundaries of this territory are on the east of the Harghita Mountains, and on the north of the Gurghiului Mountains. This territory represent the upper part of the Târnave rivers basin, the most important watercourses are the Târnava Mică and Târnava Mare rivers, and streams like Brădești, Fernic and Corund which flow into them. The relief altitude is here between 400 and 700 m above the sea level, the medium annual temperature is about 8°C.

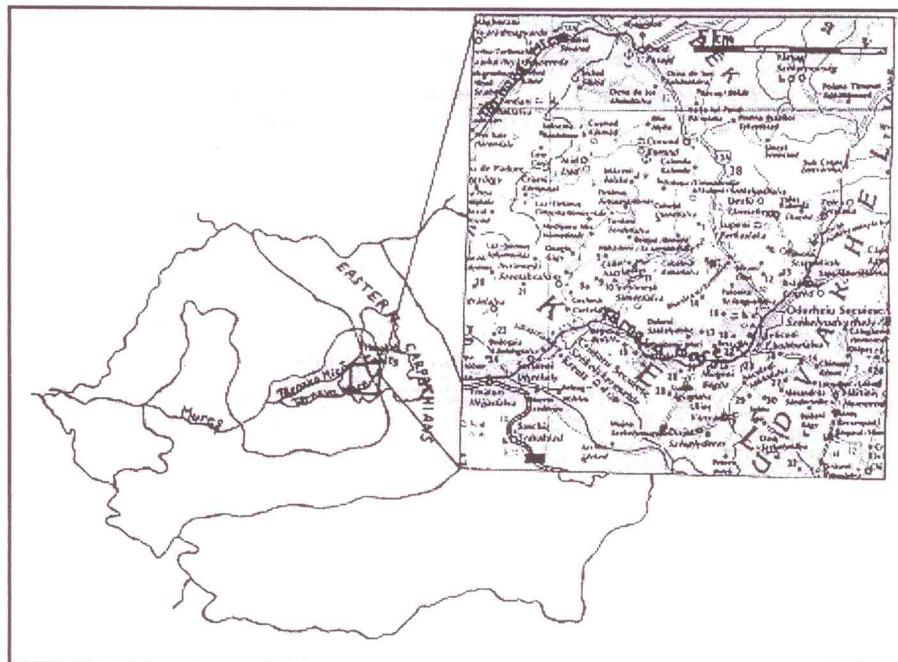


Fig. 1: Location of the study area.

The study basis was the survey of 32 village churches in July 1999 and 2000. The species were determined by visual observations, we didn't capture specimens in their roosts, to avoid unnecessary disturbance. Number of specimens was counted or if it wasn't possible estimated. Besides this survey work visual observations, detectorings carried out sporadically in different parts of the study area and determination of dead specimens provide some faunistical data.

RESULTS AND DISCUSSION

During a survey of house-dwelling bat colonies in July 1999 and 2000, we checked 32 churches in villages in the study area. In 18 buildings were found bats, in one of them two bat species were present, but in different parts of the building. Thus, bats populated 56,25% of the checked buildings. In seven churches, we found more than 10 specimens. It means that 21,87% of the churches roosts colonies need attention from the point of view of protection.

In summer females form nursery colonies in favourable roosts (buildings, hollows, caves), where they give birth and grow up youngsters. These colonies often consist by hundreds or thousands of individuals, a big colony assures a more favourable energy budget for bats. Males meanwhile aren't present in colonies they wander using several roosts (Zahn and Dippel, 1997).

The following species were found in buildings: *Myotis myotis/Myotis blythii*, *Eptesicus serotinus*, *Plecotus austriacus*, *Rhinolophus hipposideros*.

Greater and lesser mouse - eared bat (*Myotis myotis* and *Myotis blythii*)

These two species are discussed together because they are similar, and often form mixed colonies. *Myotis blythii* is somewhat lesser and has a white spotted between ears (Arlettaz et al., 1991), but the two species are hard to separate even in case of individuals kept in hand. Certain separation can be realized by osteological measurements (Topál, 1969; Kowalski and Ruprecht, 1981; Görner and Hackethal, 1987; Valenciuc, 2002). During mistnettings made in the vicinity of the study area (in the Vârghiş Gorge) both species were captured, but *Myotis myotis* seems to be more frequent. In consequence, we can suppose that both two species occur in the study area.

These two species are the most frequent in the buildings of the area. We found them in nine churches in 1999 and 2000, in five buildings lived large colonies, consisting of 60-700 specimens. Later, in October 2002 a solitary exemplar was found in the church of Dealu Village. Probably this specimen roosted here for a shorter period of time during autumn migration or searching for a suitable hibernating place.

Serotine bat (*Eptesicus serotinus*)

This species is a frequent house-dwelling bat, in summer occurs almost exclusively in buildings. In the Hungary is the most frequent house - dwelling bat (Dobrosi, 1997), the number of individuals in colonies shows an increasing tendency in the past years (Bihari, 1990, 1996a; Boldogh and Gombkötő, 1996; Papp, 1996). Studies carried in Western Europe suggest that the serotine is one of those bat species which shows a good adaptation to human environment (Catto et al., 1995, 1996; Robinson and Stebbings, 1997; Gaisler et al., 1998).

The serotine bat is the second frequent species in the buildings of the area, it was recorded in seven churches. The maximum number of individuals was 10, in the other cases only few (one-six) individuals were found.

Grey long - eared bat (*Plecotus austriacus*)

In Hungary is the second frequent among house-dwelling bat species (Dobrosi, 1997), but seems to be rare in the study area. Three individuals were found in a building. This species doesn't show a serious demand for the size of the entrance holes in buildings, probably the geographical and climatic conditions aren't suitable in the study area.

In December 2002, a dead specimen was found in the cellar of an old building in Dealu Village. It was an adult female, with 40,6 mm forearm length and 5,5 mm long thumb.

Lesser horseshoe bat (*Rhinolophus hipposideros*)

Rhinolophus species need large holes to enter in buildings, and this fact reduces the number of roosts which are suitable for them.

We could find it in two churches, two respectively ten individuals, in the first case probably a female and its offspring.

Table 1: House - dwelling bats in the study area.

Species	Nr. of individuals	Locality	Date
<i>M. myotis/M. blythii</i>	1	Brădești	26.07.1999
<i>M. myotis/M. blythii</i>	2	Târnovița	26.07.1999
<i>M. myotis/M. blythii</i>	1	Sâncraia	26.07.1999
<i>M. myotis/M. blythii</i>	120	Tăureni	27.07.1999
<i>M. myotis/M. blythii</i>	100	Mujna	27.07.1999
<i>M. myotis/M. blythii</i>	60	Văleni	28.07.1999
<i>M. myotis/M. blythii</i>	700	Mihăileni	29.07.1999
<i>M. myotis/M. blythii</i>	1	Inlăceni	19.07.2000
<i>M. myotis/M. blythii</i>	120	Atid	19.07.2000
<i>E. serotinus</i>	3	Mugeni	27.07.1999
<i>E. serotinus</i>	10	Cobățești	29.07.1999
<i>E. serotinus</i>	2	Betești	29.07.1999
<i>E. serotinus</i>	3	Porumbenii Mari	29.07.1999
<i>E. serotinus</i>	1	Satu Mare	30.07.1999
<i>E. serotinus</i>	2	Atid	19.07.2000
<i>E. serotinus</i>	6	Ocna de Jos	20.07.2000
<i>P. austriacus</i>	3	Ulieș	27.07.1999
<i>Rh. hipposideros</i>	10	Inlăceni	19.07.2000
<i>Rh. hipposideros</i>	2	Firtușu	19.07.2000

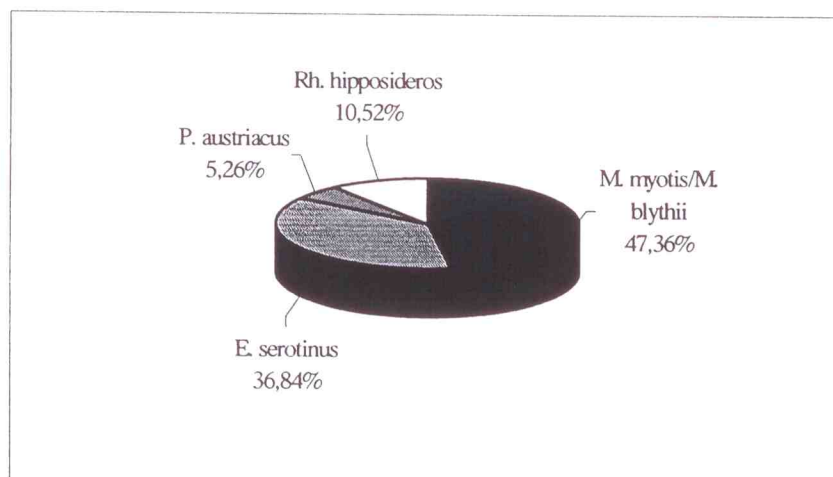


Fig. 2: The division of buildings inhabited by certain species.

Noctule bat (*Nyctalus noctula*)

It's one of those few bat species which are well adapted to human environment (Gaisler et al., 1998). It is present even in large cities. Primarily a tree - dwelling bat but nowadays specimens often use crevices in buildings, even in block of flats for roosting.

It was recorded many times using bat detector, seems to be one of the most frequent species in the study area and probably in the whole country.

Localities: Odorheiu Secuiesc, Băile Szejke, Dealu, Ulcani, Sâncraii, Subcetate Artificial Lake, Vârșag.

Pipistrelle bat (*Pipistrellus pipistrellus*)

It is the smallest bat in Europe, often can be found in settlements. As a consequence of its size can use a variety of roosts, seems to be frequent. It was recorded with ultrasound detector in different habitats mainly in town Odorheiu Secuiesc.

Localities: Odorheiu Secuiesc, Subcetate Artificial Lake

Daubenton's bat (*Myotis daubentonii*)

The species is strongly attached with habitats characterized by water all over Europe. It was recorded with bat detector in a few cases over or in vicinity of rivers or lakes. It can be found roosting also in settlements.

Localities: Odorheiu Secuiesc, Subcetate Artificial Lake

Barbastelle bat (*Barbastella barbastellus*)

It is a tree-dwelling bat, during hibernation, in winter can be recorded in caves, but usually in small number. It is rare all over Europe (Bihari, 1996b), and also in Romania (Murariu, 1995; Valenciuc, 2002).

An adult female was found in a pile of board in Băile Szejke, near Odorheiu Secuiesc town.

Localities: Băile Szejke

Data gained have mainly faunistical importance, more detailed and longer period studies are needed to observe changes which happens in bat populations. Earlier than 1999 we couldn't find chiropterological data from the study area in the literature. Data presented in the paper contribute to the knowledge of bat distribution in the area, during next years probably presence of other bat species will be proved.

ACKNOWLEDGEMENTS

We would like to thank to School Foundation which supports partly the costs of our work and for those people who let us in churches and made it possible to get the information for our work.

REFERENCES

1. Arlettaz, R., Ruedi, M., Hausser, J, 1991 – Field morphological identification of *Myotis myotis* and *Myotis blythi* (Chiroptera, Vespertilionidae), a multivariate approach, - *Myotis*, 29, 7 - 16.
2. Barbu, P., Sorescu, C., 1968 – Observații asupra unei colonii estivale de *Plecotus austriacus* (Fischer, 1829) din Banat, *St. și Cerc. Biol., Seria Zool.*, T. 20, Nr. 2, 165 - 170.
3. Bihari, Z., 1990 – Adatok a Zempléni - hegység épületlakó denevéreinek felméréséhez - *Calandrella* IV/1.
4. Bihari, Z., 1996a – A Zempléni - hegység épületlakó denevéreinek populációdinamikai vizsgálata, - *Denevérkutatás, Hungarian Bat Research News*, 2, 15 - 21.
5. Bihari, Z., 1996b – Denevérhatózás és denevérvédelem, MME, Budapest, 110.
6. Boldogh, S., Gombkötő, P., 1996 – Monitoring and conservation of house - dwelling bat colonies in the administrative area of Aggteleki National Park., *Research in Aggtelek National Park and Biosphere Reserve*, Vol 2, 185 - 193.

7. Catto, C. M. C., Racey, P. A., Stephenson, P. J., 1995 – Activity patterns of the serotine bat (*Eptesicus serotinus*) at a roost in southern England, *J. Zool.*, 235, 635 - 644, London.
8. Catto, C. M. C., Hutson, A. M., Racey, P. A., Stephenson, P. J., 1996 – Foraging behaviour and habitat use of the serotine bat (*Eptesicus serotinus*) in southern England, *J. Zool.*, 238, 623 - 633, London.
9. Dobrosi, D., 1997 – Az épületekben lakó denevérek országos felmérésének eredményei 1991 - 1997, - I. Magyar Denevérvédelmi Konferencia (Sarród, 1997, november 29) kiadványa, 16 - 20.
10. Dumitrescu, M., Orghidan, Tr., Tanasachi, J., 1962 - 1963, Răspândirea chiropterelor în R. P. Română, *Lucr. Inst. Speol. 'Em. Racoviță'*, 1 - 2, 509 - 575.
11. Gaisler, J., Zúkal, J., Rehak, Z., Homolka, M., 1998 – Habitat preference and flight activity of bats in a city, *J. Zool.*, 244, 439 - 445, London.
12. Görner, M., Hachethal, H., 1987 – Säugetiere Europas, Neumann Verlag, Leipzig.
13. Jére, Cs., Dóczy, A., 2001 – Előzetes adatok Hargita megye épületlakó denevérfaunájáról, *Collegium Biologicum*, Vol 3., 45 - 56.
14. Kowalski, K., Ruprecht, A. L., 1981 – Bats - Chiroptera, in Keys to Vertebrates of Poland, Mammals (ed. Z. Pucek), Polish Scientific Publishers, Warszawa.
15. Méhely, L., 1900 – Magyarország denevéreinek monographiája, 372, Budapest.
16. Murariu, D., 1995 – Mammal species from Romania, Categories of conservation, *Trav. Mus. Natl. Hist. Nat. "Grigore Antipa"*, vol. XXX, 549 - 566.
17. Papp, K., 1996 – Adatok Győr-Moson-Sopron megye épületlakó denevérfaunájához, Denevérkutatás, *Hungarian Bat Research News*, 2, 22 - 27.
18. Paszlavszky, J., 1918 – Mammalia, in, Fauna Regni Hungariae, Budapest.
19. Răduleț, N., 1997 – The presence of *Myotis blythi* (Tomes, 1857), (Chiroptera, Vespertilionidae) in Maramureș (România), *Trav. Mus. natl. Hist. nat. "Grigore Antipa"*, vol. XXXVII, 159 - 166.
20. Robinson, M. F., Stebbings, R. E., 1997 – Home range and habitat use by the serotine bat, *Eptesicus serotinus*, in England, *J. Zool.*, 243, 117 - 136, London.
21. Topál, Gy., 1969 – Denevérek - Chiroptera, in, *Magyarország állatvilága, Fauna Hungariae*, XXII/2, Akadémiai Kiadó, Budapest.
22. Valenciuc, N., 1989 – Dynamic of movements of bats inside some shelters, in European Bat Research, 1987 (Eds: V. Hanák, I. Horacek, J. Gaisler), Charles Univ. Press, 511 - 517, Praha.
23. Valenciuc, N., 2002 – Fauna României - Mammalia - Chiroptera, Vol. XVI, Fasc. 3, Editura Academiei Române, București.
24. Valenciuc, N., Ion, I., 1969 – Date noi privind răspândirea chiropterelor în România, *Analele Științ. ale Univ. "Al. I. Cuza", Secț. Biol.* 15, 1, 135 - 138.
25. Zahn, A., Dippel, B., 1997 – Male roosting habits and mating behaviour of *Myotis myotis*, *J. Zool.*, 243, 659 - 674, London.